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United States Department of Agriculture,
OFFICE OF EXPERIMENT STATIONS,
A. C. True, Director.

WORK AND PUBLICATIONS OF DRAINAGE INVESTIGATIONS.

STAFF.

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SCOPE OF WORK.

The work of Drainage Investigations in the Department of Agriculture was begun in 1902 and has since been continued under authority of the acts making appropriations for the Department, which have contained clauses providing for Irrigation and Drainage Investigations by the Office of Experiment Stations.

The field of investigations has rapidly extended since its inception, until at the present time it covers portions of thirty States in all sections of the country. The general scope of the work embraces the investigation of the best practical methods—

(1) Of removing surplus water from lands which have an agricultural value;

(2) Of protecting fertile lands from the periodical overflow of streams;

(3) Of reclaiming tidal lands which are susceptible of profitable cultivation;

(4) Of controlling and conserving the rainfall on tillable hillside lands.

In pursuance of these ends the work is carried on along the following lines:

First.—The study of drainage literature and the dissemination of whatever knowledge of value is thus obtained. This includes the examination and study of—

(*a*) Methods of drainage which have been employed at any time, either at home or abroad, whether successful or failures, that all possible light may be obtained on the solution of drainage problems constantly arising in connection with advance in agriculture;

(*b*) Drainage laws in force in this country, with a view to bringing them up to the highest possible point of efficiency, and also to making their provisions clearly understood by those who have occasion to use them;

(*c*) Drainage laws of other countries and the possible adaptation of good points in them to meet the requirements in the United States;

(*d*) The collection and systematic arrangement of the principles and best methods of practice in drainage, together with the wide dissemination of such knowledge for the information and stimulation of all who should be interested in this subject.

Second.—The rendering of practical assistance in the initiation and direction of drainage improvements in representative localities. Such assistance consists of reports as to the feasibility of proposed drainage schemes, based upon thorough examinations and, when needed, preliminary surveys, accompanied, in case the projects are found to be practicable, by working plans for the location and construction of the necessary drains, levees, etc., including an estimate of their cost. Aid of this nature is available to individual farmers, to communities, and to drainage districts, at strategic points where instruction in the possibilities of drainage, promotion of correct practice, and solution of new problems will be of general benefit to large areas, any profit to the parties concerned being incidental and not a part of the object.

Third.—The solution of special problems in drainage presented in the various parts of the country. Among these are—

(*a*) Irrigated lands injured by seepage water;

(*b*) Lands subject to periodical overflow;

(*c*) Salt marsh lands;

(*d*) Muck and peat lands;

(*e*) Hillside farm lands;

(*f*) Farm lands which have failed to be benefited by ordinary methods of drainage.

Fourth.—Original experimental research to secure valuable data for the use of engineers and others in making plans and estimates. Among the subjects of such research are the following:

(*a*) The maximum discharge of water from drained watersheds of different areas;

(*b*) The fluctuation curve of the water table in drained fields;

(*c*) Changes in the physical structure of subsoil clays resulting from their drainage;

(*d*) Movement and behavior of soil water in irrigated land;

(*e*) The laws governing erosion and sedimentation of ditches;

(*f*) The coefficient of flow in small drainage channels at flood height;

(*g*) The effect of the removal of bends upon the carrying capacity of a drainage channel;

(*h*) Tests of cement drain tile.

Knowledge obtained along the foregoing lines is disseminated by means of printed bulletins and reports, personal consultation and correspondence, public addresses, and manuscript reports prepared for special localities.

PUBLICATIONS OF THE OFFICE OF EXPERIMENT STATIONS RELATING TO DRAINAGE.

[July 1, 1908.]

PUBLICATIONS FOR RESTRICTED DISTRIBUTION.

These bulletins will be furnished free, so long as they are available, to libraries, educational institutions, the press, State and foreign officials connected with agriculture, exchanges, and such persons as are in active cooperation with the Department or render tangible service in its work. Other persons can obtain them from the Superintendent of Documents, Government Printing Office, Washington, D. C., by payment of the price given; postage stamps and personal checks are not accepted.

Bulletin No. 147.—Report on Drainage Investigations in 1903. By C. G. Elliott. Pp. 62, pls. 5, figs. 12. Price 10 cents.

Includes discussions of plans for drainage near Fresno, Cal.; in the Yakima and Atanum valleys, Washington; in the Grey Bull Valley, Wyoming; in the Missouri Valley; in Hancock County, Iowa; of hillside lands subject to erosion in Georgia.

Bulletin No. 189.—Report on the Drainage of the Eastern Parts of Cass, Traill, Grand Forks, Walsh, and Pembina Counties, North Dakota. By John T. Stewart. Pp. 71, pls. 6, figs. 2. Price 25 cents.

Discusses general topographic and climatic conditions of the region under consideration as related to drainage; size and form of ditches required; erosion and silting of ditches; effect of straightening natural drainage channels; method of making survey; estimates of quantities and cost of excavation; detailed estimates for each county accompanied by maps showing location of all the proposed ditches.

Bulletin No. 198.—The Prevention of Injury by Floods in the Neosho Valley, Kansas. By J. O. Wright. Pp. 44, pls. 14, figs. 3. Price 15 cents.

Describes the present condition of the valley and river channel, and the attempts which have been made to secure protection from injury; explains in detail a plan for protecting from injury the overflowed lands by means of levees, based on a comprehensive survey of the valley; gives specifications for building the levees, and estimates their cost.

PUBLICATIONS FOR FREE DISTRIBUTION.

Farmers' Bulletin No. 187.—Drainage of Farm Lands. By C. G. Elliott. Pp. 40, figs. 19.

Explains the effects and advantages of drainage; describes the construction, cost, and behavior of open drains; discusses tile drainage in full, including location, depth, frequency and size of drains, details of their construction, accessories, cost and profit; treats of the drainage of irrigated land.

Circular No. 74.—Excavating Machinery Used for Digging Ditches and Building Levees. By J. O. Wright. Pp. 40, figs. 16.

Describes the use and construction of different classes of dredges, including dipper, clamshell, rotary, roller, scraper, elevator, and hydraulic dredges, and drag boats; first cost, and cost of operation of dredges; machines for levee building; machine for tile ditching.

Circular No. 76.—The Swamp and Overflowed Lands of the United States. By J. O. Wright. Pp. 23, pl. 1.

Gives an estimate of the area of swamp lands in the different States, its ownership, present value, cost of reclamation, and probable value when reclaimed, and discusses the State laws relating to drainage.

Separate No. 9, Bulletin No. 158.—Report of Drainage Investigations, 1904. By C. G. Elliott. Pp. 100, pls. 4, figs. 29.

Discusses ground water records; drainage in Utah; cleaning dredged drainage ditches; construction and maintenance of large ditches through sandy lands; plans for the drainage of the bottom lands of the Missouri River in South Dakota; reclamation of overflowed land, including locations on the Illinois, Wabash, and Mississippi rivers; levee construction and maintenance; Florida Everglades; Wisconsin marsh lands; drainage of hillside farm lands; Indiana tile drainage.

Document No. 799.—Report of Irrigation and Drainage Investigations, 1904. By Elwood Mead, Chief. Pp. 425–472. (Reprint from Annual Report of Office of Experiment Stations for 1904.)

Discusses scope of the year's work; ground water fluctuations at Fresno, Cal.; experimental drainage of irrigated land in Utah; protection by means of levees of overflowed bottom lands in the humid region; levee construction; machinery for laying tile drains.

Document No. 925.—Drainage Investigations. By C. G. Elliott. Pp. 197–210. (Reprint from Annual Report of Office of Experiment Stations for 1905.)

A general discussion of the field of work of the Drainage Investigations.

Document No. 1028.—Reclamation of Tide Lands. By J. O. Wright. Pp. 373–397, pls. 5, figs. 6. (Reprint from Annual Report of Office of Experiment Stations for 1906.)

Discusses beneficial results obtained from the reclamation of tide lands both in this country and in Europe; best methods of reclamation; suitable location, shape, and size of dikes or embankments; machinery fitted for doing the work; wave protection; tide gates; internal drainage and supplementary pumping plant; specifications for building embankments and sluice gates.

PUBLICATIONS OUT OF PRINT.

The supply of the following publications is exhausted and hence they are no longer available for distribution:

Yearbook Extract No. 265.—Some Engineering Features of Drainage. By C. G. Elliott. Pp. 231–244, pl. 1, figs. 2. (Reprint from Yearbook, 1902.)

A brief discussion of some general features of drainage and a description of some drainage works near Greeley, Colo.

Circular No. 50.—Preliminary Plans and Estimates for Drainage of Fresno District, California. By C. G. Elliott. Pp. 9.

Circular No. 57.—Supplemental Report on Drainage in the Fresno District, California. By C. G. Elliott. Pp. 5.

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